

WATER QUALITY OF CUSTER COUNTY

Ground Water

No ground-water samples were collected in Custer County during the MDA 2005 Yellowstone River Valley Project.

Public water supplies are required to periodically test their water for various constituents including pesticides and nitrate. A search of public water supplies entities in Custer County did not find any public water supply obtaining water from shallow ground water in alluvial aquifers along the Yellowstone River. There are two public water supplies, one in Kinsey and one at the Kircher school, that are obtaining ground water from deep (250-500 feet) bedrock aquifers which are generally not vulnerable to human activities at the surface. Neither of these public water supplies has had a pesticide or nitrate detection for the period from 2000 to 2005.

Surface Water

Miles City obtains its public water supply from the Yellowstone River in Custer County. This supply is tested periodically for pesticides and nitrate. Since 2001 Miles City has tested the river water four times for pesticides and there has not been any detections of pesticides. The river water has been tested 11 times for nitrate and there have been detections in ten of those samples ranging from 0.14-1.01 mg/L. The drinking water standard for nitrate is 10 mg/L.

Between 1999 and September 2004 the U.S. Geological Survey (USGS) collected samples from the Yellowstone River near Forsyth just west of Custer County and analyzed them for pesticides and nutrients. Although this station is not in Custer County the data may be an indicator of the water quality of the Yellowstone River coming into Custer County. The USGS has also collected nitrate samples from the Powder River near Locate and tested them for nitrate.

Between 1999 and September 2004 the USGS collected 65 samples from the Yellowstone River near Forsyth and analyzed them for pesticides. The most commonly detected pesticides were atrazine, triallate, metolachlor, prometon, and cyanazine (see table below). All these pesticides, with the exception of prometon, are commonly used herbicides in corn, sugar beets, and small grain crops. Prometon, which is a nonselective herbicide used in non-agricultural settings, is more commonly used and detected in urban areas (Barbash and Resek, 1996). All of the pesticide concentrations were low and none of the concentrations exceeded any human health standards or aquatic life standards where such standards exist. The USGS analytical method for pesticides has much lower detection limits than those used by the public water supplies and the detections from the USGS study are for the most part below the detection limits for the analytical method used by the public water supplies. It is also important to note that many of the herbicides used for noxious weed control (2,4-D, picloram, and imazapyr, to name a few) were not analyzed for during the USGS monitoring effort, so the impacts of these control measures on the Yellowstone River remain unclear.

Between 1999 and September 2004 the USGS collected 74 samples from the Yellowstone River near Forsyth and analyzed them for nitrate. Nitrate was detected in 72 of the 74 samples at concentrations ranging from 0.03 – 0.65 mg/L with a median concentration of 0.2 mg/L (see table below). Nitrate concentrations showed a seasonal variation with higher concentrations occurring between October and March and lower concentrations occurring during the April to September time frame (Miller et al, 2004). These seasonal variations are believed to be due to a lack of algal activity which consumes nitrate during the winter as well as decreased dilution due to low stream flows during the winter.

Summary of Pesticide*/Nitrate Detections in the Yellowstone River near Forsyth from 1999 through September 2004 Collected by the U.S. Geological Survey							
Pesticide Compound	Number of Samples Collected	Number of Samples with Pesticide Detected	Percent of Samples with Pesticide Detected	Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Drinking Water Standard (µg/L)	Aquatic Life Standard (µg/L)
Atrazine	65	51	78.5	E 0.003	0.328	3	1.80
Benfluralin	65	1	1.5	--	E 0.003	--	--
Carbaryl	65	1	1.5	--	0.005	700	0.20
Carbofuran	65	1	1.5	--	E 0.034	40	1.80
Chlorpyrifos	65	1	1.5	--	E 0.002	20	0.041
Cyanazine	65	10	15.4	E 0.003	0.018	1	2.0
EPTC	65	7	10.8	E 0.001	0.16	--	--
Malathion	65	1	1.5	--	E 0.004	100	0.10
Metolachlor	65	29	44.6	E 0.002	0.034	100	7.80
Prometon	65	19	29.2	M	E 0.01	100	--
Propargite	65	1	1.5	--	0.41	--	--
Simazine	65	1	1.5	--	E 0.003	4	10
Tebuthiuron	65	2	3.1	M	E 0.01	500	1.60
Triallate	65	33	50.8	E 0.001	0.012	--	0.24
Trifluralin	65	1	1.5	--	E 0.002	5	0.20
Nutrient Compound	Number of Samples Collected	Number of Samples with Nitrate Detected	Percent of Samples with Nitrate Detected	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Drinking Water Standard (mg/L)	Aquatic Life Standard (mg/L)
Nitrate + Nitrite	74	72	97.3	0.03 E	0.65	10	--
E = Estimated value M = Presence of chemical verified but not quantified * This table only contains a summary of pesticides detected; many other pesticides were analyzed for and not detected							

Between 1999 and 2004 the USGS collected 69 samples from the Powder River near Locate and analyzed them for nitrate. Nitrate was detected in 43 of the 69 samples at concentrations ranging from 0.013 – 1.58 mg/L and a median concentration of 0.3 mg/L.

Barbash, J.E., and Resek, E.A., 1996, Pesticides in ground water – Distribution, Trends, and Governing Factors: Chelsea, Michigan, Ann Arbor Press, Pesticides in the Hydrologic System series, v. 2, 588 p.

Miller, K.A., Clark, M.L., and Wright, P.R., 2004, Water Quality Assessment of the Yellowstone River Basin, Montana and Wyoming – Water Quality of Fixed Sites, 1999-2001, U.S. Geological Survey Scientific Investigation Report 2004-5113.

Smith, L.N., LaFave, J.I., Patton, T.W., Rose, J.C., and McKenna, D.P., 2000, Ground-Water Resources of the Lower Yellowstone River Area: Dawson, Fallon, Prairie, Richland, and Wibaux Counties, Montana. Montana Bureau of Mines and Geology Montana Ground-Water Assessment Atlas No. 1.